OPTIMIZATION OF ORMOSIL COATING ON AA2024-T3

B.G.Prakashaiah and B.E.Amitha Rani

Surface Engineering Division, CSIR-NAL, Bengaluru, INDIA

Abstract

Sol-gel coatings are emerging today as green replacement to chromium coatings in the aerospace sector. Sol-gel coating was fabricated using three silanes - Tetraorthosilicate , Vinyl triethoxy silane and 3-(trimethoxysilyl) propyl methacrylate by dip and spray method. The coating was optimised by altering the water/silane ratio to obtain a sustainable, pore free corrosion resistant coating on AA2024-T3. The water/silane molar ratio of R values 2, 4&8 were investigated by Electrochemical Impedance Studies and Potentiodynamic polarization studies.Lower molar (R=2) ratio ormosil coatings were hydrophobic (104°) and exhibited enhanced corrosion resistance (I_{corr} = 0.0192 $\mu A/cm^2$) compared to the other coatings and one order of magnitude higher than the bare.The dip method appeared to be better than spray coating method with respect to film homogenity and corrosion resistance. The impedance values were as follows R=2 (1531 k Ω) > 4 (162 kΩ) > 8 (63 k Ω). Thus, it appears that an R value of 2 is optimum to obtain sustainable corrosion resistant coatings.